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Pros and Cons of Robotic Transaxillary Thyroidectomy

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Many techniques using videoscopic (also referred to as endoscopic and laparoscopic) and robotic approaches for thyroidectomy in the treatment of benign and malignant thyroid disease have been described in the literature (1). One such approach is robotic transaxillary thyroidectomy, which was pioneered at Yonsei University, South Korea, and which has been used in some centers in the United States (2–8). This surgical approach has generated much interest in the medical and surgical fields, as well as in the lay public, partly due to heavy marketing of this technology. In this issue of *Thyroid*, Drs. Chung and Inabnet provide commentaries on the pros and cons of robotic transaxillary thyroidectomy.

Because of the contributions of Kocher, today's conventional (open) thyroidectomy is associated with very low morbidity when performed by experienced surgeons with specialized training in endocrine surgery, and it remains the gold standard approach at many centers. Kocher introduced meticulous hemostasis, strict antisepsis, and, initially, a vertical incision for thyroidectomy. With more operative experience, he transitioned from the vertical incision to an incision along the anterior border of the sternocleidomastoid, and finally to a low, transverse cervical incision (9,10). Today most endocrine surgeons use a small, high cervical incision situated in a prominent skin crease because it results in superior cosmesis; however, not all patients are satisfied with their scar and in some cases, patients develop a hypertrophic scar and, rarely, a keloid scar.

The main reason the videoscopic and/or robotic thyroidectomy approaches were developed was to avoid an incision in the neck (incisions in the axilla, chest, oral cavity, or around the ear, so-called "scarless" thyroidectomy) or to use only tiny incisions (1–5 mm) in the neck. The advantage of such approaches is cosmetic, although some suggest better visualization and magnification of the operative field with the videoscopic approach, and better surgeon ergonomics and dexterity with a robotic approach. Unlike videoscopic cholecystectomy, which was rapidly adopted into practice, conventional thyroidectomy is a subcutaneous operation associated with very low complication rates, minimal pain, and near nil mortality when performed by specialized, experienced endocrine surgeons. Thus, it is not surprising that the various new approaches for thyroidectomy reported in the literature have not been widely adopted. Nonetheless, many surgeons who developed these techniques have continued to use and refine their approaches in select groups of patients and have provided useful data on the feasibility, indications, and complications associated with these procedures (11–13).

There has been much interest in the robotic transaxillary thyroidectomy. Using a robot allows for better dexterity than the videoscopic approach, which was used for the initial development of the transaxillary gasless approach, and data on hundreds of patients have been published (14). These data, as reported by the surgeons who developed this technique, suggest the approach is feasible, is associated with a learning curve of approximately 40–50 cases, and results in relatively low complication rates; however, significant complications, which are not usually encountered using a cervical incision, have occurred, albeit rarely (14,15).

The indication for robotic transaxillary thyroidectomy has been extended to papillary thyroid cancer, and primarily to papillary thyroid microcarcinoma. Although the data suggest that the completeness of the robotic thyroidectomy is similar to conventional thyroidectomy, the follow-up time has been too short to truly assess the oncologic outcome (16). Many questions remain: For example, is the robotic transaxillary thyroidectomy cost effective? What guidelines should be used for training a surgeon to use this approach? What is the long-term outcome for clinically significant thyroid cancer? Are many patients likely to be candidates for this approach? For example, patients in the United States have larger body habitus and higher body mass index than those in South Korea. What new complications, and at what rate, would we observe if this approach rapidly proliferates in clinical practice?

Drs. Chung and Inabnet provide us with cogent commentaries from their respective continents on the advantages and disadvantages of robotic transaxillary thyroidectomy and clarify its possible role in the future (17,18). Not all surgical innovations are rigorously put to the test of evidence-based medicine before their wide dissemination and implementation in clinical practice, as some innovations are clearly beneficial. However, robotic transaxillary thyroidectomy should be rigorously evaluated in prospective clinical trials to assess patient outcome, complications, cost, and patient satisfaction before it becomes widely accepted and utilized. Such future studies and increasing experience will provide a better understanding of the viability of robotic transaxillary thyroidectomy.

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